APPENDIX D

Estimated Statewide Annual Average Ambient ETS Concentrations Calculations

APPENDIX D

Estimated Statewide Outdoor Annual Average Ambient ETS Concentrations

To provide perspective on exposure, staff of the ARB is presenting an estimated range of outdoor annual average ambient ETS concentrations in California for urban areas. The staff used ETS PM_{10} (RSP) emission and concentration data as the basis for this estimate. The staff then used data from emission factor studies to correlate the generation of ETS RSP to generation of nicotine emissions.

For these calculations, the staff assumed that ETS RSP data was uniform throughout each air basin and that there is an underlying background level that exists for ETS. For nicotine, the staff also assumes that its ratio to RSP remains constant, even though the constituents including nicotine reactions in the atmosphere at different rates.

The table below shows the data used to estimate the statewide annual average ETS RSP and nicotine concentrations. The calculations are included in the footnotes.

The staff used 2002 California PM_{10} emissions inventory data, ETS PM_{10} (RSP) emissions data (Chapter IV), and statewide criteria pollutant PM10 measurement data to calculate statewide annual average ETS particulate concentration data. Staff used the studies from Martin *et al.,* 1997 and Nelson, 1994 to show a correlation between nicotine and RSP. This ratio was then used to estimate the statewide annual average nicotine concentration from the ETS particulate statewide estimate.

Estimated ETS PM_{10} and Nicotine Concentrations Per Air Basin

Air Basin	Counties	[a,c]ETS RSP (tons/day)	[d]PM_{10} Inventory (tons/day)	ETS RSP PM_{10} Emission Inventory	[c]PM_{10} Conc. mg/m^3	[b]ETS PM_{10} Conc. mg/m^3	[b]ETS Nicotine Conc. mg/m^3
Great Basin Valley	Alpine, Inyo, Mono	.0167	217	.00008	159.3	.0127	.0016
Lake County	Lake	.0027	11.8	.00022	13.1	.0029	.0004
Lake Tahoe	El Dorado, Placer	.0066	5.2	.00126	17.1	.0215	.0027
Mojave Desert	Kern, Los Angeles, San Bernardino, Riverside	.3567	164	.00218	24.2	.0528	.0065
Mountain Counties	Amador, Calaveras, El Dorado, Mariposa, Nevada, Placer, Plumas, Sierra, Tuolumne	.0291	115	.00025	25.9	.0065	.0008
North Central Coast	Monterey, San Benito, Santa Cruz	.0200	72	.00028	28.9	.0081	.0010
North Coast	Del Norte, Humboldt, Mendocino, Sonoma, Trinity	.0175	76	.00023	22.9	.0053	.0007
Northeast Plateau	Lassen, Modoc, Siskiyou	.0081	73	.00011	17.5	.0019	.0002
Sacramento Valley	Butte, Colusa, Glenn, Placer, Sacramento, Shasta, Solano, Sutter, Tehama, Yolo, Yuba	.0811	228	.00036	31.8	.0114	.0014
Salton Sea	Imperial, Riverside	.0567	255	.00022	82.5	.0182	.0022
San Diego	San Diego	.0700	116	.00060	52.4	.0314	.0039
SF Bay Area	Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, Solano, Sonoma	.1601	202	.00079	30.2	.0239	.0030
San Joaquin Valley	Fresno, Kern, Kings, Madera, Merced, San Joaquin, Stanislaus, Tulare	.0734	339	.00022	59.9	.0132	.0016
South Central Coast	San Luis Obispo, Santa Barbara, Ventura	.0300	76	.00039	28.6	.0112	.0014
South Coast	Los Angeles, Orange, Riverside, San Bernardino	.4200	290	.00145	58.4	.0847	.0105
Statewide Average						**.0204**	**.0025**

a : equals PM_{10}
b : estimated value
c : 2002 values, from Chapter IV of the draft report Part A
d : 2003 values, from the 2004 California Almanac of Emissions & Air Quality

Step 1: ETS PM_{10} concentration ($\mu g/m^3$) = (ETS RSP/ PM_{10}) x (PM_{10} conc. ($\mu g/m^3$))
Step 2: ETS Nicotine concentration ($\mu g/m^3$) = (ETS PM_{10} concentration ($\mu g/m^3$)) / * (8.1)
* 8.1 is the average ratio of ETS RSP to ETS nicotine. Reference studies based on Nelson, 1994 and Martin, 1997.